SNS COLLEGE OF PHYSIOTHERAPY

COIMBATORE-35

COURSE NAME:BIOMECHANICS

2nd year

TOPIC : POSTURE

Empathize

Observe individuals struggling with postural problems due to gravity imbalance

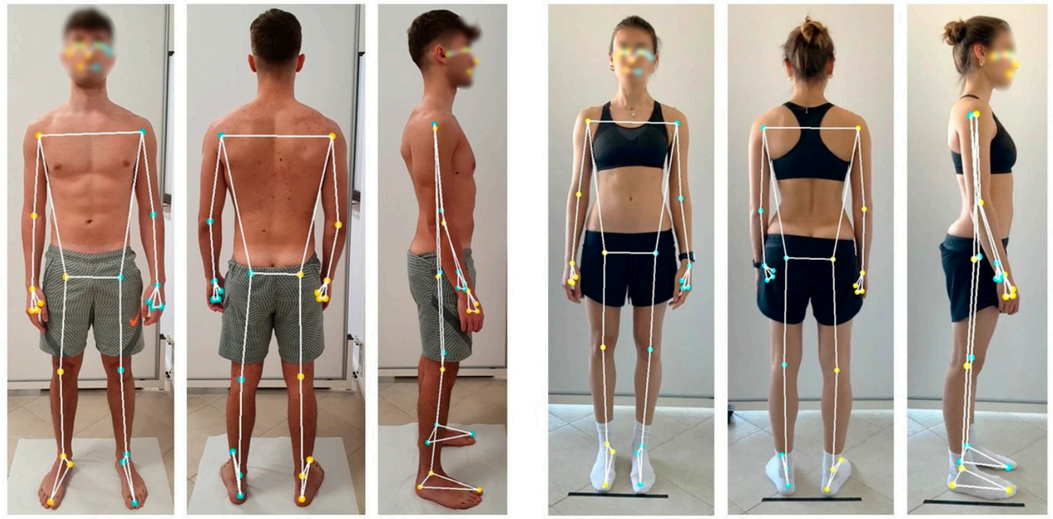
Communicate with patients/students experiencing:

Neck & back pain

Fatigue from prolonged standing/sitting

Difficulty maintaining posture

Tools: Posture analysis, plumb line, pain scale, ergonomic evaluation



Ideate

Brainstorm solutions to improve alignment & reduce gravity stress:

Postural correction exercises

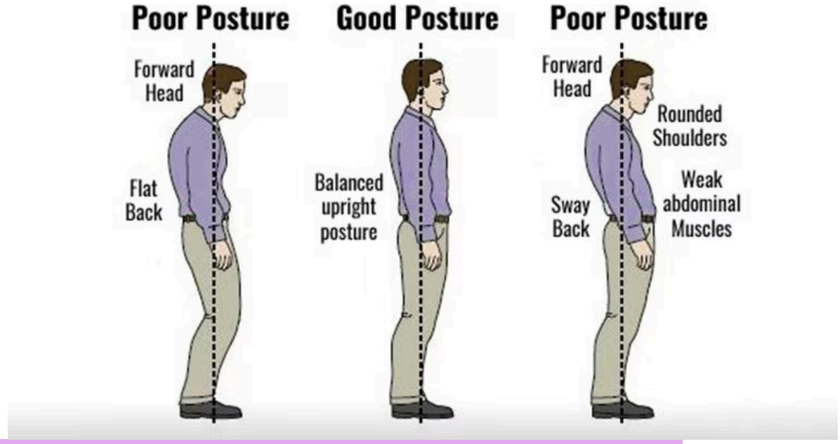
Stretching & strengthening programs

Ergonomic workstation modifications

Instruction on standing & sitting alignment

Digital posture analysis & plumb-line assessment

Orthotic support for foot alignment



Define & Explain

Problem Statement Example:

📍 “Individuals experience musculoskeletal pain and fatigue due to deviation of the gravity line from optimal sagittal alignment, increasing gravitational stress on joints & soft tissues.”

Identify root causes:

Poor ergonomics, weak postural muscles, prolonged sitting, incorrect footwear

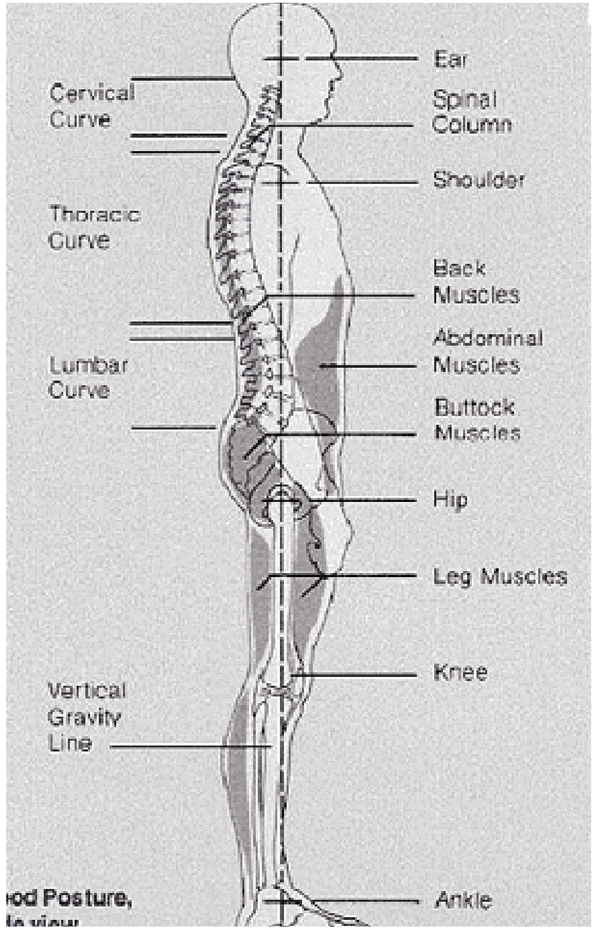
Lack of awareness about optimal gravity line

INTRODUCTION TO GRAVITY

Gravity is a constant downward force acting towards the earth's center

Human body must continuously work against gravity to stay upright

Posture stability depends on counteracting gravitational pull effectively



GRAVITATIONAL MOVEMENTS

When body segments move away from alignment, gravity creates torque

Muscles & ligaments resist these rotational forces

More deviation = more effort = increased injury risk

Ideal posture minimizes gravitational torque

EFFECT OF GRAVITY ON BODY MOVEMENTS

Body Region Effect of Gravity Misalignment

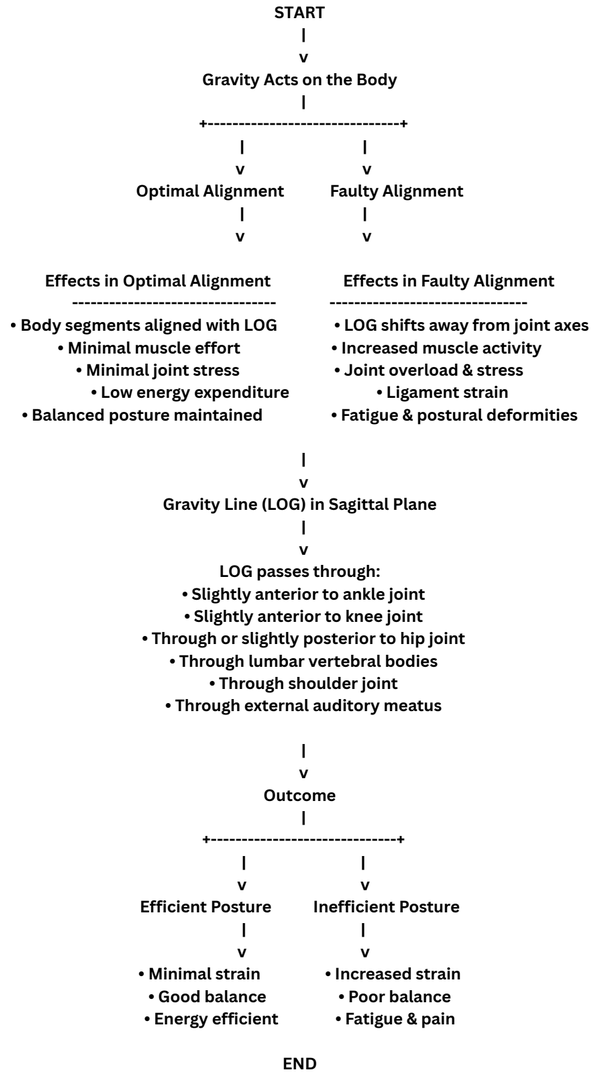
Head & Neck Forward head posture → Cervical strain

Spine Excess kyphosis/lordosis → back pain

Pelvis Anterior/posterior tilt → lumbar instability

Lower Limbs Knee hyperextension or flexion → uneven load distribution

Flow Chart (Roadmap)



MCQs

1. In optimal posture, the line of gravity in the sagittal plane passes:
A. Posterior to the ankle
✅B. Anterior to the ankle
C. Through the heel
D. Posterior to the toes
2. Which is a beneficial effect of gravity in proper posture?
A. Increased energy expenditure
✅B. Decreased muscle activity
C. Increased joint compression
D. Decreased balance stability
3. When posture is faulty, gravity tends to cause:
A. Less ligament strain
✅B. Increased muscle fatigue
C. Reduced spinal curvature
D. Increased mechanical efficiency
4. The line of gravity normally passes through which cranial landmark?
A. Mastoid process
✅B. External auditory meatus
C. Occipital protuberance
D. Mandibular angle

MCQs

5. In the sagittal plane, the LOG lies where relative to the knee in ideal alignment?

A. Clearly posterior

B. Clearly anterior

✅C. Slightly anterior but close to axis

D. Through the patella

6. Gravity acts as which type of force on the spine during poor posture?

A. Tensile force only

✅B. Compressive force

C. Distractive force

D. No force

7. Which joint is MOST stabilized by ligaments when the LOG falls anterior to it?

A. Hip

✅B. Knee

C. Shoulder

D. Elbow

8. One major function of maintaining proper LOG alignment is:

A. Increasing load on postural muscles

✅B. Reducing metabolic cost of standing

C. Encouraging spinal deformity

D. Increasing joint shear